

Remarks

Claims 15-31 and 33-40 remain in this application and are presented for the Examiner's review and consideration. In this response, claims 15, 29, 36, and 39 are amended, claims 32 and 38 are canceled, and claims 40-41 are added. No new matter has been added.

Claim Objections

Claims 31 and 32 were objected to as being identical, and each dependent from claim 30. Accordingly, claim 32 has been herein canceled.

In light of the foregoing, Applicant requests reconsideration and withdrawal of the objection.

Claim Rejections under §112

Claims 29, 37 and 39 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite.

Initially, Applicant notes that claim 36 rather than claim 37 contains the cited term "...lies at the same location...". Applicant will assume the rejection intended to state claim 36 instead of claim 37, and requests correction if this is not the case. Accordingly, claims 36 and 39 have been herein amended in accordance with the rejection.

In light of the foregoing, Applicant requests reconsideration and withdrawal of the §112 rejections.

Claim Rejections under §102

Claim 15 was rejected under 35 U.S.C. §102(b) as being anticipated by Bloomfield (U.S. Patent 5,224,474) ("Bloomfield"). It appears that claims 16, 18-19, 27-28, and 30-34 were additionally rejected upon the same basis. Initially, Applicant notes that claim 32 has been canceled, herein.

Bloomfield

Bloomfield discloses an electrical amplifier unit which removably attaches to a gas mask and includes a separate microphone for detecting voice sounds emitted by the wearer of the gas mask, circuitry for amplifying the detecting sound, and a loudspeaker for emitting the amplified sounds externally of the mask. (Abstract).

Referring first to FIGS. 1A, 1B and 2 of Bloomfield, the retrofitting gas mask amplifier unit is generally shown at 10. (Col. 2, lns. 51-52). The gas mask amplifier unit 10 is similar to that disclosed in the prior [Bloomfield] application with the exception that the microphone is part of a separate microphone/adaptor assembly 11 (FIG. 1B). (Id). The voice sounds emitted by the mechanical emitter (otherwise known as diaphragm) forming a part of the gas mask are transferred to the amplifier unit 10 for amplification and emission from a loudspeaker contained in the amplifier unit 10. (Id).

FIG. 1B of Bloomfield illustrates the microphone/adaptor assembly 11 which attaches to a gas mask and mates with the amplifier unit 10. (Col 2., lns 43-45). The assembly 11 comprises a microphone 34 and an adaptor ring 36. (Id). The adaptor ring 36 is designed to attach to a gas mask and to receive the amplifier unit 10. (Id).

With reference to Fig. 6 of Bloomfield, the microphone 34 fits over the mechanical emitter 86 whereby the clip member 34c fits over a flange 96 of the mechanical emitter 86. (Col. 5, lns. 16-19).

With further reference to Fig's. 1B, 5 and 7 of Bloomfield, the microphone 34 is connected to the adaptor 36 by an insulated lead 38a which passes through a protective rubber connecting member 38b. (Col. 3, lns. 62-64). To electrically connect the microphone to the internal electronics of the amplifier unit 10, a surface of the face portion 36a is coated with a conductive solder material. (Id).

Thus, Bloomfield places a microphone over a gas mask voice emitter, and conveys the microphone output over a wire (38a), not a sound tube. The wire 38a electrically connects to electronic circuitry and a speaker mounted elsewhere on the gas mask. Thus, Bloomfield does not direct sound from an exhale diaphragm to a microphone.

Present Invention

In contrast, the present invention discloses a microphone adaptor for a respirator having a speech projector, the adaptor comprising a sound tube with a first open end arranged to be located in the vicinity of the speech projector of the respirator and a second open end arranged to be attached to a microphone, whereby speech emanating from the speech projector can be transmitted via the sound tube of the adaptor to the microphone. ([0014]).

The respirator preferably comprises an exhale diaphragm located in a region substantially in front of the mouth of an operative which diaphragm opens into the speech projector to provide a direct passage between the mouth of the operative and the first open end of the sound tube when the operative exhales during the speech process. ([0023]). This provides a clear passage for speech direct to the microphone. (Id).

The present invention enables speech to be received from the speech projector of a modern respirator without the need to mount a microphone in the proximity of the speech projector, which may impede the speech from the speech projector. ([0015]). More importantly, by employing the present invention speech is received from the speech projector which speech has a direct path from the mouth of the operator through the open exhale diaphragm (one has to exhale to speak) through the sound projector to the microphone via the microphone adaptor. (Id). The advantage of this is that because the speech is direct, and has not passed through the fabric of the respirator, the high frequency components are substantially intact making the invention particularly advantageous if the microphone is connected to a digitally encrypted radio. (Id).

The present invention provides significant advantages over current arrangements, where a standard issue microphone is clipped to the speech diaphragm on the side of the respirator. ([0017]). In addition to the improvement in speech quality there is also no requirement for an additional respirator microphone. (Id).

Thus, the present invention eliminates using a voice diaphragm as the sound source for electronic instruments, avoiding the drawback of reduced quality, particularly in the context of digitally encrypted communication, and further avoids the requirement of an additional microphone.

As stated in the present invention, respirators typically comprise an inner face seal, which is between the mouth of the operative and the speech diaphragm. ([0008]). This inner face seal degrades speech reaching the speech diaphragm and indeed the speech diaphragm itself is not perfectly transparent to speech. (Id). Thus, speech received by a microphone mounted to the speech diaphragm is of relatively poor quality compared to speech that would be received directly from the operative. (Id).

The rejection states that Bloomfield discloses a sound tube (38a). However, reference 38a is "an insulated lead", or a wire. While reference 38a appears to possibly include a tubular structure surrounding the wires (Fig. 7), this would be the typical mechanical/electrical insulation for the wires as is well known in the relevant art. Applicant respectfully submits a wire, even an insulated one, cannot be deemed a "sound tube", and particularly not for conducting sound travelling in air, as does the sound tube of the present invention.

The rejection further states that reference 38a transmits speech emanating from the speech projector to the microphone. Applicant respectfully disagrees, and submits that reference 38a transmits an electrical signal from a voice diaphragm (which is blocked to the passage of air), not a speech projector (which uses a valve to permit the passage of exhaled air), and transmits that signal via a wire to an electronic amplifier circuit, not a microphone.

Accordingly, Bloomfield operates in a different manner, by placing a microphone at a diaphragm, and produces a different result, sound output having a loss of sound quality resulting in digital sound reproduction problems. Further, Bloomfield does not address the problem attendant with connecting multiple microphones, in particular the diaphragm microphone and a boom microphone. More particularly, Bloomfield fails, at least, to disclose or suggest a sound tube as is claimed and disclosed. A sound tube conducts sound in air in distinction to an electrically transduced signal over a wire. Bloomfield further fails to disclose or suggest directing sound **from** the exhale path, **via** a sound tube, **to** the microphone, as is claimed. In Bloomfield, sound travels to a microphone disposed in front of a diaphragm not in the exhale path, and **from** the microphone **via** a wire **to** an amplifier.

Claim 15 has been amended herein to emphasize that the present invention transmits sound in the exhaled air, and recites, a microphone adapter for a respirator having an exhale diaphragm, the adapter comprising a sound tube with a first open end designed to be located and held proximate the exhale diaphragm, to receive and conduct speech sound travelling in exhaled air therefrom, and a second open end designed to be coupled to transmit the sound travelling in exhaled air to a microphone located outside and adjacent the respirator, whereby, in use, speech emanating from the exhale diaphragm is conducted by and transmitted via the sound tube to the microphone.

Independent claim 18 recites, *inter alia*, a sound tube with a first open end designed to be located and held relative to the speech projector to receive speech therefrom at a point ***downstream of an exhale diaphragm*** and a second open end designed to be *coupled with a microphone*... whereby, in use, speech emanating from the speech projector is transmitted via the sound tube ***to the microphone***.

Independent claim 27 recites, *inter alia*, ...speech emanating *from the speech projector* is transmitted *via the sound tube to the microphone*.

Accordingly, Applicant respectfully submits that independent claims 15, 18 and 27 are patentable over Bloomfield. As claim 16 depends from claim 15; claim 19 depends from claim 18; and claims 28, 30-31 and 33-34 depend from claim 27, these dependent claims necessarily include all the elements of their base claim. Accordingly, Applicant respectfully submits that the dependent claims are allowable over the cited references for the same reasons.

In light of the foregoing, Applicant requests reconsideration and withdrawal of the §102 rejection.

Claim Rejections under §103

Claim 37 was rejected under 35 U.S.C. §103(a) as being unpatentable over Bloomfield. Claims 20 and 34 were rejected under 35 U.S.C. §102(b) as being unpatentable over Bloomfield in view of Chen (U.S. Patent 5,279,286).

As discussed above, Applicant respectfully submits that independent claims 15, 18 and 27 are patentable over Bloomfield. As claim 37 depends from claim 15; claim 20 depends from claim 18; and claim 30 depends from claim 27, these dependent claims necessarily include all the elements of their base claim. Accordingly, Applicant respectfully submits that the dependent claims are allowable over the cited references for the same reasons.

In light of the foregoing, Applicant requests reconsideration and withdrawal of the §103 rejection.

Allowable Subject Matter

Applicant acknowledges with appreciation that claims 21-26 were allowed, and that claim 38 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant has accordingly canceled claim 38, and added claim 41 to include all of the limitations of claims 15, 16 and 38, and respectfully submits that claim 41 should therefore be in allowable form.

Conclusion

In light of the foregoing remarks, this application is now in condition for allowance. If any questions remain regarding this response or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

A fee of \$1,050 is believed to be due for a three month extension. However, please charge any required fee (or credit any overpayments of fees) to the Deposit Account of the undersigned, Account No. 503410 (Docket no. 779-X03-002).

Respectfully submitted,

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